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HOME-MADE MOVIES COMING

Movies in the home have been made practicable through the development of a new motion picture camera and projector that can be used by the amateur, according to Dr. C. E. K. Mees, director of the research laboratory of the Eastman Kodak Company.

The new taking camera weighs only seven pounds and is said to be simple in operation. This reduction is obtained by the use of very small pictures and narrow width film. The special film and a carefully designed optical system have allowed diminutive apparatus without any serious sacrifice in quality of the pictures obtained.

"While the history of photography shows that most of the new developments have been due to the work of amateurs, the field of the motion picture has heretofore largely been closed to those outside the professional ranks. This has been due partly to the lack of suitable apparatus, but even more to the high cost of taking and printing the films," said Dr. Mees in commenting on the new apparatus.

The film for the new movie outfit is 11/16 inch wide as against the standard width of 1-3/8 inch. The picture is 1 x 3/4 centimeters as compared with the standard picture of 1 x 3/4 inches. Five pictures on the small film consequently occupy the same length as two on the standard, so that 100 feet of the new film are equivalent to 250 feet of standard and a 400 feet reel is equivalent to the standard 1000 feet reel. The film is of the non-inflammable type and coated with a special emulsion which enables the negative to be developed and then by a new process reversed to give a direct positive picture.

The lens is an anastigmat working at f.3.5, permitting photographs to be made under poor light conditions. The finder is just above the lens and by an ingenious attachment changes the position of its image as the lens is focused. In this way the image is shown through the center of the field at all times. The lens has a focusing lever carried through to the back which can be focused for any distance from infinity to four feet. The diaphragm control is in the left hand corner and can there be read easily. In the center of the back is a footage indicator showing the quantity used, in feet. The crank turns nominally twice a second, taking pictures at the standard rate of 16 per second. The camera is daylight loading, the film being supplied in a special magazine.

The new projector is motor driven and is entirely automatic in its operation.

Once a film is threaded the machine requires no further attention until the reel is exhausted. For home projection a lens of two inch focal length is used, the picture filling a 30 x 40 screen at a distance of 18 feet and a 40 x 54 screen at 21 feet.

READING REFERENCE- Reynolds, F. W. Motion picture films of educational value in the possession of associations and commercial and manufacturing companies. U. S. Bureau of Education. 1920. Cameron, J. R. Motion picture projection. 2d. ed. Theatre Supply Co. 1921.

(A Chat on Science)

PERCENTAGE ALIVENESS

By Dr. Edwin E. Slosson.

When I dropped into Prof. Winthrop J. V. Osterhout's laboratory at Wood's Hole by the sea I found him at first quite too busy to talk to me. Every minute or two his assistant would hand him a porcelain dish containing a few drops of cell sap which he would hastily analyze by counting the number of drops from a pipette that would change its color. It was a familiar chemical test and in fact I would have thought myself in the laboratory of a chemist instead of a botanist if it had not been for some basins of dank seaweed lying around. There was a lot of electrical apparatus too, galvanometers, resistance boxes and the like, such as no botanist ever bothered with in the days when I was young.

In those days the boundaries between the sciences were well defined and a professor knew what he was professor of. Even if he taught two or more sciences he was careful not to mix them. A botanist did not have any use for a chemist unless he wanted to borrow paraffin or alcohol from him. Now the botanists and zoologists seem to be going over in a body to chemistry and physics. And it is a question how much will be left of the biological sciences when the physical sciences get what they want out of them.

The differences between the old botany and the new became still more apparent to me when Prof. Osterhout explained to me what he was doing and what he was aiming at.

He was endeavoring to apply quantitative measurement to the processes of life, to find mathematical formulas that would show just how much a plant or animal cell is alive or how near it is to the zero point, which we call death. Mathematics is another thing that the old-fashioned botanist had no use for. It is as easy to count the petals on a flower as to count one's fingers. But Prof. Osterhout's new book, "Injury, Recovery and Death", is chock-full of mathematical symbols of the toughest sort.

He finds one of the best ways to measure vitality is to determine how well a cell conducts electricity. For the protoplasm that fills all cells offers considerable resistance to the passage of a current so long as it is alive but as soon as it is dead its resistance falls off. If it is partly dead its resistance is measurably reduced.

Give Prof. Osterhout various samples of seaweed of which some are thriving and others have been injured in varying degrees by putting them into water that is too fresh or too salt, or by exposure to hot sunshine or by poisoning with nicotine. They all look equally green and healthy, but by testing the conductivity he can tell you which have been injured the most and how much.

What is more he can tell which have been injured beyond recovery and which will be restored to a state of normalcy on being put into ordinary seawater. If, for instance, a strip of eel grass has been injured to the extent of five percent by over-salting it will recover fully when it gets back into its native element. But if it has been injured 25 percent its electrical resistance rises to only 90 per cent of the normal. If the injury amounts to 90 per cent there is no recovery.

He finds whatever alters the electrical conductivity of plant or animal tissue, whether it be a crushing blow, too much heat, lack of air, lack of water, presence of poisons or anything else, will shorten or impair the life of the organism. He comes to the conclusion that life is a series of balanced chemical processes and that when this balance is disturbed by a change in the environment one process goes faster than another and then the creature grows or decays, thrives or declines. Dying is therefore a normal part of living. The only danger is in its getting to going too fast.

Prof. Osterhout does not say anything about the application of his discoveries and theories to human life. So far as I know he has not carried his experiments farther up the scale of life than frog's skin. So it will be some time before we can know whether there is any sense in our crude quantitative expressions of vitality, "I feel half dead" or "more dead than alive", by which we mean usually that we are "dead tired".

READING REFERENCE- Osterhout, W.J.V. Experiments with plants. N. Y. Macmillan.1905.
Reed,Howard S. The value of certain nutritive elements to the plant cell.v.... Oxford, Oxford Univ. press. 1907.

GOOD HEALTH MADE GAINS LAST YEAR, STATISTICS SHOW

The death rate for the year 1922 was 8.8 per 1,000 lives and was the lowest, save one, ever recorded, according to statistics just compiled by the Metropolitan Life Insurance Company. This record is based on the mortality report of millions of industrial policy holders of that company which constitute over one-eighth of the population of the United States and Canada. The facts revealed in this report are considered to afford the earliest reliable index of general health conditions in the two countries during the year just closed.

For the last six months of the year 1922, the record was the best ever shown for any half year in history covered by policyholder statistics. But considering the whole year, the record for the previous year, 1921, shows a death rate slightly lower, not quite one per cent. less. Had it not been for the outbreak of epidemic influenza in the early months of 1922, the year's health record would have been better than the minimum established in 1921.

The 1922 death rate for tuberculosis, 113.4 per 100,000, was the lowest ever recorded. Since 1911 the tuberculosis death rate has been reduced nearly one-half. The mortality from this disease has been falling at a very rapid rate among

the wage-earning group of the population and is continuing to decline year by year.

The year 1922 recorded the lowest typhoid fever death rate in the history of the insured. The figure was 5.6 per 100,000, a reduction of one-sixth from the rate from 1921 and of nearly three-fourths from the figure recorded in 1911.

Pronounced improvement was shown in three of the four common communicable diseases of children, namely, diphtheria, scarlet fever, and whooping cough. The measles death rate rose slightly.

The year's record shows a reduced death rate for diseases related to child-bearing. The figures show that there is, nevertheless, much to accomplish in this very important field of health work.

In the field of violent deaths declines were recorded for suicides, homicides, accidental burns and accidental drownings.

Increases were recorded in 1922 over the record of 1921 for influenza, pneumonia, organic heart diseases, diabetes, Bright's disease, cerebral hemorrhage, and alcoholism. Among the violent deaths there were increases in the rates for accidental falls, machinery accidents, railroad accidents, and especially automobile accidents. For the last named, the death rate increased in 1922 ten and seven-tenths per cent.;the 1922 death rate was nearly six times the rate for 1911; forty-eight per cent of the deaths in automobile accidents were those of children under 15 years of age.

"The further rise in the automobile accident death rate is a challenge to the instinct of self-preservation of the American and Canadian populations,"

The increase in 1922 for chronic nephritis and cerebral hemorrhage were slight.

The diabetes rate increased 10 per cent. in 1922, and the figure for that year, 17.0 per 100,000, is the highest on record. The alcoholism death rate rose from 0.9 per 100,000 to 2.0, which is equivalent to a rise of 122 percent. This is the highest alcoholism death rate since 1917, but is still much lower than the rates recorded for all years prior to 1918. Deaths from wood alcohol poisoning are not included in these figures.

AERIAL LEXICOGRAPHERS EXPLAIN FLYING TERMS

A standard dictionary of the air language under the title of "Nomenclature for Aeronautics" has just been published by the National Advisory Committee for Aeronautics.

Among some of the new terms prescribed by the Committee are the following:

"Airway" - an aerial highway between three or more cities, marked and equipped with fields, radio stations, etc.

"Airport" - a terminal of an airway, with tracts of water and land for alighting, shops, hangars, etc.

"Amphibian" - an airplane designed to rise from and alight on either land or water.

Most automobile operators will expect that "gassing" means filling the fuel tanks of an aircraft, but it applies to replenishing the envelopes or containing bags of lighter-than-air craft with fresh lifting gas such as hydrogen or helium, to compensate for leakage. The filling of an empty balloon with gas is known as "inflation".

Gender has practically been eliminated from terms used in flying. A "pilot" today is either a man or woman operator of an aircraft. The term applies to both heavier and lighter-than air operations. The old terms "aviator" and "aeronaut" are discarded. "Aviatrix" was never approved of officially.

NEWS OF THE STARS

Venus Now Farthest West of the Sun

By Isabel M. Lewis,
of U. S. Naval Observatory

The silvery radiance of Venus as Morning Star in the east before sunrise has become well-known to the early riser during the past few months. On each successive morning for some time the planet has been rising earlier and drawing farther away from the sun until on February 4 it reached its greatest distance west of the sun, or its greatest western elongation, when it was nearly forty-seven degrees west of the sun and rose more than three hours before sunrise.

The position of Venus with respect to the sun will change very little during the month of February though its distance from the earth is increasing steadily. It will continue to be the most brilliant and beautiful stellar object in the morning sky for some months to come. Now is an excellent time to view the planet through the telescope. At the time of elongation the crescent phase that it has exhibited for several months changed to that of half-moon and after elongation its phase is that of the gibbous moon between first-quarter and full. More and more of the planet's illuminated or day side will come into view as spring succeeds to winter but as the distance of the planet from the earth increases the size of the disk decreases greatly, so that later it cannot be studied to as great advantage as now when only about one half of the illuminated surface can be seen.

Most observers of the silvery planet are unable to detect any markings at all on its disk though others have seen and even photographed faint, elusive markings against a background of dazzling brilliancy. Though we are accustomed to speak of Mars as the planet of mystery, the puzzles which this sister-planet of ours presents us with seem to be unsolvable. If, as the Mt. Wilson astronomers have discovered from spectroscopic observations, there is no trace of oxygen and water vapor in the atmosphere of Venus, what is the nature of this silvery veil with which the fair Venus pleases to hide her features? Is it possible that she is hiding behind a permanent dust screen which reflects the sun's rays almost as perfectly as a mirror? It is a well-known fact that after exceptional volcanic activity has taken place upon the earth the upper strata of the atmosphere are permeated with a finely-divided volcanic dust that persists for months after the eruption has taken place. This dust is an excellent reflector of the incoming rays of the sun and for this reason there is always a decided drop in the earth's surface temperature after great volcanic activity has occurred. Possibly our sister-planet is a seat of great volcanic activity. This would tend to fill its atmosphere with finely-divided dust, lower its surface temperature and cause the incoming rays of the sun to be largely reflected from its upper atmosphere to outer space, thus effectually concealing its surface markings and giving it its appearance of dazzling brilliancy.

Then there is the still unsolved problem of the rotation period of Venus. Has Venus, like the earth, a short period of rotation or a long period equal to the period of its revolution around the sun? The vagueness of its surface markings

makes itsdifficult to settle this question definitely. At its present elongation the distance of Venus from the earth is 62,560,000 miles which is as great as the distance of Mars at a most unfavorable opposition. By March 1 the dista nce of Venus from the earth will have increased to 80,280,000 miles.

HONOR MEMORY OF PIONEER NATURALIST

Scientists from all parts of the country gathered in Washington on Feb. 3 to celebrate the centenary of the birth of Spencer Fullerton Baird, pioneer naturalist and secretary of the Smithsonian Institution.

Dr. David Starr Jordan, ex-president of Leland Stanford University, who was associated with Baird in his fisheries work; Dr. C. Hart Merriam, first chief of the U. S. Biological Survey; Dr. Edwin Linton, for many years a colleague of Baird; Dr. William Healey Dall, of the U. S. National Museum and the U. S. Geological Survey; and Dr. C. G. Abbot, assistant secretary of the Smithsonian Institution reviewed the activities of this scientific pioneer.

SPENCER FULLERTON BAIRD

Spencer Fullerton Baird, the centenary of whose birth is being celebrated, was one of the leading zoologists of this country, a scientist of wide attainments, and an administrator of remarkable ability. He was secretary of the Smithsonian Institution and for twelve years he served as the first U. S. Commissioner of Fish and Fisheries. His work in protecting and propagating fish marked an epoch in economic science in this country.

Dr. Baird attracted attention early in life by his writing as a naturalist. During this period he would walk twenty to fifty miles a day searching for material. At the age of twenty-two, he became professor of Natural History at Dickinson College and later added the teaching of chemistry to his schedule.

When at the age of twenty-seven, he was appointed assistant secretary of the Smithsonian Institution, he brought two freight cars full of specimens.

On becoming secretary in 1878 when Secretary Joseph Henry died, his ability at getting cooperation from government departments and private individuals was strikingly shown in the foundation of the U. S. National Museum.

He died at the "greatest biological laboratory in the world" which he had planned at Woods Hole, Mass., in 1887 and was succeeded by Prof. Langley, of airplane fame, as the secretary of the Smithsonian.

Between 1858 and 1874 he wrote "North American Serpents," "Birds of North America," "Mammals of North America," "History of North American Birds," which are equivalent to the life-time output of the ordinary man. He also served as editor of Harper's scientific department and wrote the yearly encyclopedia called the "Annual Record of Science and Industry".

ACCIDENT CAUSES DISCOVERY OF NEW WOOD PRESERVATIVE

The accidental spilling of a bronze liquid on the kitchen table by a handy man about the house painting the home radiators, has led to the discovery of a new way to protect wood from moisture, Carlile P. Winslow, director of the Forest Products Laboratory, Madison, Wis., has informed the Engineering Foundation.

The mishap that led to invention occurred on the "unfinished" top of a kitchen table. Before the investigator could get a cloth, the bronzing liquid had dried. Connecting this incident in his mind with his work at the laboratory, he started a series of experiments and a bronze coating, composed of a cheap gloss oil and aluminum powder superior to many other moisture proof coatings for use indoors was developed.

For years this governmental laboratory has been working on a method of preventing the shrinking, swelling, and warping caused by changes in the moisture content of wood. Furniture and wooden parts made for use in New York open their joints, or even come apart, in Arizona, while if wood is dried to a moisture content suitable for Arizona, not a drawer can be moved in New York.

The success of the experiments has mollified the exasperated wife, it is said.

READING REFERENCE- Achatz, Raymond V. Preservative treatment of wood poles. Lafayette, Ind. Engineering experiment station. 1920. Bibl.

LAYS DOWN OCEAN LANES FOR TRANS-PACIFIC SHIPS

Steamship companies will soon have to "double-track" the Pacific ocean to avoid traffic accidents, in the opinion of the Hydrographic Office of the U. S. Navy, which has announced the best eastbound and westbound routes for ships to take throughout the year.

Trans-Pacific shipping has greatly increased in the last few years, and in the near future it will be essential to safety that the steamship companies enter into an agreement making it mandatory upon the masters of vessels to follow definite routes, instead of going in any direction they wish as at present, the announcement stated. To meet this condition, the Hydrographic Office has made a careful study of distance, storms, prevailing winds, fogs, and ocean currents, and recommends the lanes for both directions between Puget Sound and Yokohama, San Francisco and Honolulu and Honolulu and Yokohama.

These steamships tracks are for all the year around. In the North Atlantic, where such routes have been followed for years, there is a shift during the iceberg season to a more southern route. The ships running between Puget Sound and Yokohama, however, do not have such dangerous ice conditions and one route can be followed all the year round.

The eastbound tracks from Yokohama to Puget Sound as laid down by the Hydrographic Office takes advantage of the Japanese current while westbound ships are routed so as to strike the weaker inside edge of the current.

The recommended routes between the northern ports is the shortest practicable

distance and runs south of the Aleutian Islands. The shortest actual distance would, of course, be along the great circle but this leads through the Aleutian Islands and is impracticable on account of fogs, ice and treacherous currents.

READING REFERENCE- Johnson, Emory R. and Huebner, G. G. Principles of ocean transportation. N. Y. D. Appleton & Co. 1919. Walden, Charles F. Ocean transportation. N. Y. Y. M. C. A. Press. 1922.

FINDS SEA CREATURES SMALL METAL MINES

Marine animals are made partly of metal. Examination by Miss H. W. Severy of Leland Stanford University of sixteen denizens of the sea from shrimps to whales has demonstrated that all contain zinc and most of them copper.

For several years it has been known that copper is present in oysters and sometimes occurs to such an extent that it colors them green and may even give them a metallic taste. Miss Severy showed that copper was also present in sea anemones, sea urchins, shrimps, crabs, salmon, and sea-lions but was absent in clam and whales. The average amount of copper found in these animals was about five parts in ten million while the zinc content amounted to four parts in one million.

Certain animals such as the snake have long been known to have some copper in their blood which gave it the blue color. It acts the same way the iron acts in the blood of higher animals: it is a carrier of oxygen to the tissues. The part zinc plays in the animal body has not been ascertained although it is assumed that it functions as an aid to the digestive fluids. Zinc apparently is more widely distributed than copper for the investigator found it in two higher animals belonging to the group of mammals, namely the sea-lion and the whale; the latter showed no trace of copper in its body.

FINDS PAINT COLORS ATTRACT SHIP BARNACLES

The color of the paint used determines the amount of barnacles which foul the bottoms of ships, experiments by J. Paul Visscher of the U. S. Bureau of Fisheries indicate.

Plates painted white, yellow, red, green, blue, and black were exposed in sea water for several months. Although the plates were exactly the same except for color, the darker plates always showed the greatest amount of fouling. Barnacles, which make up a large percentage of the fouling, collected only on the blue and black plates.

The tendency of the barnacle larvae to go away from the light seems to account for the difference in the attraction of the various colored plates. The experiments are being continued.

READING REFERENCE- Flatterly, Frederick W. and Walton, C. L. The Biology of the sea shore. London, Sidgwick & Jackson. 1922. Hickson, Sydney J. The story of life in the seas. N. Y. 1915. (Library of valuable knowledge). Calman, W. T. Marine boring animals injurious to submerged structures. London British Museum. 1919.

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[illegible] SEA CREATURES [illegible] METAL [illegible]

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READING REFERENCE- [illegible] The history of the [illegible]. London. [illegible]. [illegible] The story of [illegible] N. Y. 1916. [illegible] injuries to submerged structures. [illegible] Museum. [illegible]

SUCCESS STUDY TO GUIDE WORK CHOICE OF CHILDREN

What do children's school grades and mental tests mean in terms of their later success in different jobs? A thorough answer to this question is a vital need to enable the rising generation to make the proper choice of work, leading psychologists and vocational guidance experts in conference at the National Research Council, Washington, have decided. Educational records, mental and physical measurements, and rating scales, taken years ago are now available for study of the success and failure of those examined, it was pointed out.

"It always has been and always will be the function of the elders to guide the coming generation into suitable life positions. A sound vocational guidance would economize human energy, save employers from useless turnover, and the employed from wasted years of work," said Dr. Raymond Dodge, head of the Council's Psychology Division in commenting on the action of the conference.

Among the psychologists and educators present were: Raymond Dodge, Grace Abbott, John M. Brewer, C. A. Doburn, Frank Cushman, M. R. Fernald, M.H.S.Hays, Emma Hirth, Harry D. Kitson, C. R. Mann, Leonard Outhwaite, C. E. Seashore, E. L. Thorndike, L. L. Thurstone, Helen B. Wooley, and C. S. Yoakum. The following institutions were represented: Boston University, Carnegie Institute of Technology, Columbia University, Harvard University, Iowa State University, Merrill-Palmer School, American Council of Education, Children's Bureau of the Department of Labor, Institute for Government Research, Personnel Research Federation, Vocational Information Bureau, Vocational Bureau of the Cincinnati Public Schools, and the Federal Board of Vocational Education.

Preparation of a high school course in psychology designed especially to aid the student to take a helpful inventory of his capacities and to promote the organization and coordination of personnel work in schools and colleges was also recommended.

There are at present in Europe and America a large number of persons and organizations devoting their time to educational and vocational guidance. Some of these agencies aim at the highest scientific completeness of the data on which advice is given, some of them are content to exercise simple common sense, some of them are pure fakes, the conference revealed.

GOVERNMENTAL TEA PARTY HELD IN NEW YORK

An important tea party was held in New York, Feb. 5. The United States Board of Tea Experts consisting of seven men who know tea, both scientifically and practically, met to formulate the governmental standards for purity and quality of teas to enter this country after May 1. This was the annual event at which Department of Agriculture representatives test and taste tea samples of many sorts.

READING REFERENCE- Browne, Edith A. Tea. London, A. and C. Black, 1912. (Peeps at industries). Gortner, R. A. Origin of the custom of tea drinking in China. Science n. s. 47:269-70. Mar. 15, 1918.

TABLOID BOOK REVIEW

THE NEW AIR WORLD; The Science of Meteorology Simplified, By Willis Luther Moore, Sc.D., LL.D., professor of meteorology, George Washington University; for eighteen years chief of the United States Weather Bureau at Washington. Little, Brown and Company, Boston, 1922. $3.00 net.

To those that regard the subject of weather as merely a conversation opener and stop-gap, this fascinating book will be a revelation. The title calls it the science of meteorology simplified; but it is more than that. It is the weather vivified and made delightful. Murder mysteries, divorce scandal, aviation, the first 4th of July, the first Christmas, the sweep of civilization, and the best temperature in which to do mental work are a few of the topics touched upon.

The amateur meteorologist will find helpful hints for extending his observation; the student will find accurate scientific information clearly presented; the general reader will find no dull pages; and the popular science writer may study this work with profit. Less imaginative scientists may shy at the author's vision of ships drawn by big kites, and future civilizations increasing health and efficiency by sky voyages, but Dr. Moore has, in this book, made a real contribution to the public's understanding and appreciation of weather science.

Naphtha and quicklime are supposed to have been the principal ingredients of the liquid fire invented by the old Greek architect Callinicus in 678 A. D. for use in warfare.

Iron was first made from iron ore in the American colonies at Jamestown in 1608.

The Isle of Pines gets its name from its forests of pine trees said to exist there at lower altitudes than anywhere else in the tropics.

More than forty different species of mosquitoes are known to occur in New Jersey.

Young diamond back terrapin fed regularly and kept warm in a hot house produce eggs one year earlier than those of the same age which are allowed to hibernate.

The highest temperature ever recorded at Havana is 101 degrees and the lowest 50 degrees.

The skeleton of one of the cliffdwellers, not a single bone of which has been moved from the position in which it was placed more than 500 years ago, is now on exhibit in the Mesa Verde National Park, in Colorado.

Most of the asbestos used in the world comes from the province of Quebec, Canada.

At a height of one and a half miles in the air, the coolest time of the twenty-four hours is during the day instead of at night, as might be expected.

An enormous number of snail shells are found in the Colorado desert while living snails of the same species are found near the outlying springs and rivulets.

White children in Central Europe from 5 to 20 years old have more than ten times as many decayed teeth as Zulu children of the same age.
